APPENDIX B.4

CHRONOLIGIC SUMMARY OF CONSTRUCTION AND DREDGING IN THE NIAGARA RIVER AND THE WELLAND CANAL

Even though it is not considered one of the Great Lakes connecting channels, the Welland Canal Diversion, because it has a direct link to the Niagara River, is included in this section of Appendix B. Its historic events, presented herein, were limited to that readily available in and taken verbatim from a report entitled "History of Canals and Related Subjects", dated September 1949, prepared by the then Department of Transport, General Engineering Branch, Ottawa, Canada. These events are not chronologically interwoven with those of the Niagara River, but are presented separately at the end of this section.

Fiscal Years — Note: No construction and/or dredging information found for those years not listed.

1807. Black Rock Harbor: Pier sank in bay below Bird Island; warehouses erected; Black Rock in competition with Buffalo for terminal harbour of Erie Canal.

1822. An "experimental pier" was constructed in the most exposed part of the Niagara River, approximately opposite the water works intake crib. This pier held thru the winter, resulting in the construction of the Black Rock Harbor by the State of New York.

1823. The construction of a pier from Bird Island to Squaw Island began; also, construction of embankments on Squaw Island.

Black Rock Lock: A dam from the lower end of Squaw Island to the mainland was built. A timber ship lock in the dam near the eastern end was also built.

1824. The construction of the pier from Bird Island changed the character of the river. In 1824, it was estimated that before the construction five times the amount of water flowed past the Canadian side of the river, while "100th part would flow down east side of Island".

1825. The Bird Island Pier and embankments were completed.

1827. Bird Island Pier: A serious break in the pier occurred in 1827 or 1828.

1837. The Bird Island Pier was repaired.

Another pier was built from the mainland near the foot of York Street (near Porter Ave).

1841. Black Rock Lock: The construction of a new stone lock began at the west end of the dam.

1842. Black Rock Lock: The stone lock was abandoned.

1849. Black Rock Lock: Work resumed on the stone lock.

1850. The construction of the Erie Basin Buffalo Harbor began.

1851. Black Rock Lock: Work on the stone lock was completed (replaced the timber lock).

1853. In the calendar year 1853, the Niagara Falls Hydraulic Company began the construction of a canal 70 ft. wide, 10 ft. deep and 3/4 mile long, starting at a point about 1 mile above the Falls on the U.S. side.

1854 to 1855. The Black Rock Harbor Ship Canal was enlarged.

1861. In the calendar year 1861, the Niagara Falls Hydraulic Company's canal was considered complete (one mill was established); by the calendar year 1880, two additional mills were using Niagara River waters.

1862. The Erie Basin Buffalo Harbor was completed.

1870. Bird Island Pier: The pier did not last. A pile jetty was built on this site in about 1870.

1871. An international railroad bridge over the Niagara River was proposed.

1872. Bird Island Pier: The first extension above Bird Island was constructed; repairs were made and a jetty at Porter Ave. was completed.

The International Railway Bridge was constructed.

1880. A survey was made at the mouth of the Tonawanda Creek.

In the 1880s, a water intake structure, about 1-1/2 miles upstream of the International Bridge, was constructed by the City of Buffalo, New York.

1881 to 1882 Dredging began in June 1881 to remove three sand bars at the head of Tonawanda Island, mouth of Tonawanda Creek and middle of Tonawanda Island Channel to a depth of 13 ft.; 24,740 cu. yds. of mud, clay and gravel removed. The project was completed in November 1881.

The material dredged from the river by the City of Buffalo, New York, in calendar year 1883 was dumped below the city water works crib. There were protests that the material was shoaling the upstream channel; therefore, the city stopped dumping in the river.

1886. In the calendar year 1886, the Niagara Falls Power Company constructed a tunnel through solid rock under the City of Niagara Falls, New York. Power was first delivered from its station (Edward Dean Adams) in the calendar year 1895.

1888. Project 1888: The objective of this project was to provide a navigation channel from the head of the Niagara River to north of North Tonawanda and dredge Tonawanda Harbor(400 ft. wide by 18 ft. deep). The work included Horseshoe Reef at the head of the Niagara River, the shoal at the head of Strawberry Island and shoals at the lower end of Rattlesnake Island.

1889. Extensive repairs were made to the Bird Island Pier.

1891 to 1892. Bird Island Pier was extended 900 ft.

In the calendar year 1892, the Hydraulic Power Company (previously known as the Niagara Falls Hydraulic Company) enlarged its canal.

1893. Project July 1892: The objective of this project was to provide an 8 ft. deep channel 300 ft. wide from Tonawanda Island to Conners Island, 200 ft. wide from Conners Island to Grass Island and 400 ft. wide from Grass Island to Port Day. Work began on this project in 1892.

In the calendar year 1893, Canada first diverted water from the Niagara River (from just above the Falls) for power production.

1894. Project July 1892: The project was modified to increase the channel depth to 12 ft.

1895. The dredging of Tonawanda Harbor to 18 ft. began.

1896. Project July 1892: A channel 12 ft. deep and 200 ft. wide for the entire length of Connors Island was completed.

Tonawanda: The channel was improved to 200 ft. wide and 18 ft. deep, for a length of 1050 ft.

1897. Strawberry Island Reef: An 18 ft. by 180 ft. channel was completed through the whole length of the reef.

The channel thru the shoal at the foot of Tonawanda Island was excavated to 18 ft. by 200 ft. and ridges from Tonawanda Harbor were removed.

Tonawanda Harbor: Work was stopped, due to the lack of funds.

1898. Work continued on the project to provide a channel 200 ft. wide and 12 ft. deep from Tonawanda to Port Day.

Shoal above Cayuga Island: An area of 81 ft. wide, 936 ft. long and 12 ft. deep was drilled and blasted thru the shoal; 24,185 cu. yds. were dredged.

Horseshoe Reef: A channel 400 ft. wide, 18 ft. deep and 1500 ft. long was completed.

1899. The construction of a bridge over the Niagara River at Lewiston, New York, was approved in August 1898.

Improvement of Buffalo Entrance to Erie Basin and Black Rock Harbor: Appropriations were approved in March 1899 to build a breakwater between the Erie Basin breakwater and the Bird Island Pier. At the close of Fiscal Year 1899, the work had not started.

Operations resumed in June 1899 to clear a channel across the reef at Strawberry Island; no excavation had started by the close of Fiscal Year 1899.

No work was done in Fiscal Year 1899 on the improvement of the Niagara River from Tonawanda to Port Day.

Extensive repairs were made to the Bird Island pier.

1900. Strawberry Island Channel: A channel was cleared across the reef; 96,380 cu. yds., scow measure, dredged.

Tonawanda: Shoal at the foot of the island; 44,895 cu. yds., scow measure, removed.

Shoal above Cayuga Island: 18,800 cu. yds., scow measure, removed.

1901. Strawberry Island Channel: The channel was completed in July 1900; 8,940 cu. yds. removed.

In the calendar year 1901, the Ontario Power Company's hydroelectric powerhouse was begun.

The Bird Island Pier was extended to about 3100 ft.

1902. Black Rock Harbor, Buffalo entrance to Erie Basin: The only work done was the placing of fenders on the breakwater to protect it.

Tonawanda Harbor and Niagara River: No work was done.

In the calendar year 1902, the Canadian Niagara Power Company's hydroelectric powerhouse was begun.

1903. Tonawanda Harbor and Niagara River: The channel across two large shoals in the main river abreast of Tonawanda Island was the most urgent work required. Dredging was confined to the shoals and channels in the vicinity of Tonawanda. The channel of Tonawanda Creek, from the Niagara River to the state dam, was dredged (completed) to a depth of 18 ft. at mean river level. The channel across the upper shoal, 800 ft. long and 400 ft. wide, and not less than 18 ft. deep at mean river level, was completed on the lower shoal. A channel 110 ft. wide and not less than 18 ft. deep at mean river level had been completed across the shoal, which varies in length from 500 on the west side to 1,200 ft. on the east side.

Dredging operations to remove sand overlaying the rock above grade at the Black Rock Harbor and Erie Basin began.

In the calendar year 1903, the Electric Development Company's hydroelectric powerhouse was begun.

1904. Required dredging was completed at the Horseshoe Reef, Strawberry Island reef, Tonawanda Creek and Tonawanda Harbor. Removal of the shoals around Tonawanda Island was completed. Excavation of the Black Rock Harbor and Erie Basin was one-third completed. Four dredges began work on the Tonawanda Harbor and Erie Basin. The Lumber Barge Massiest was dislodged from the intake pier of the Water Works.

1905. There was a small amount of dredging and rock removal at the Black Rock Harbor. Dredging of the channel section of the Erie Basin was completed. A small shoal was removed from the Niagara River. Dredging of the channels in the vicinity of Tonawanda was completed.

1906. Dredging of the channel section of the Black Rock Harbor was completed, except for clearing up and dredging of the Basin Section.

1907. The channel from the Buffalo North entrance to the Erie Basin was 85% completed and the Basin 75% excavated. Removal of the wrecked steamer Amber from the Niagara River near the Grand Island shore, about 1.5 miles above Tonawanda was nearly completed.

1908. Removal of the wrecked steamer Amber was completed. Excavation and steel piling work was done on the Black Rock Channel; half completed.

1909. Improvements of the Lake Erie entrance to the Black Rock and Erie Basin were completed. The cofferdam for the lock walls were completed and dewatered, and the excavation of the Black Rock Harbor and channel continued. The sunken scow Trader was removed from the Niagara River off of the East Shore of Strawberry Island.

1910. Channel excavation continued under the existing contracts, and at the close of the Fiscal Year were nearly complete. The excavation of the Black Rock Channel was 61% completed.

1911. Improvements to the Niagara River began. Also, work continued, under existing contracts, on the Black Rock Harbor. The Bird Island Pier was repaired.

1912. Improvements on the Niagara River were completed. Work on the Black Rock Harbor continued, under existing contracts, with four being completed and five other partially complete.

1913. Work on the Black Rock Harbor, under existing contracts, was 90% completed.

1914. Work on the Black Rock Harbor, under existing contracts, was 97% completed. The Ferry Street Bridge over the Erie Canal and Black Rock Harbor was removed. Erection of a new traveler bridge took place. Extensive work was done on the Black Rock Lock.

1915. Work on the Black Rock Harbor, under existing contracts, was 98% completed. Rock excavation from Ferry Street to the ship lock was completed. A 30 day test operation of the Ferry Street Bridge was completed. The temporary bridge pivot pier was removed.

1916. Dredging of Section 2 of the Niagara River was completed, except for lumps; Section 3, was 85% completed.

1917. Operating machinery of the Black Rock Canal was being overhauled. A safety-gate switchboard was fitted into place and completely overhauled.

1918. A small shoal was removed from the Black Rock Canal.

Beginning in 1918, water was diverted from the Niagara River through the New York State Barge Canal mainly for navigation.

Also in 1918, the approach channel leading to the intakes of the Niagara Falls Power Company was deepened and 200,000 cu. yds. of rock were dumped into the Chippawa-Grass Island Pool.

1919. Routine operations and maintenance were carried out and some pipe laid;
Also, waterworks intake pipes in the Niagara River replaced.

From 1919 to 1921, while the intake for the Queenston Power Plant was under construction, large quantities of earth and rock were dumped into the Chippawa-Grass Island Pool below the intake.

1921. Bulkheads were constructed in the Niagara River along areas around Ferry Street. A deep-water channel was extended down the Niagara River and turning basin at its lower end.

1922. Maintenance dredging was carried out on the Black Rock Channel.

1923. The Ferry Street storehouse was completed. The Squaw Island Dike was reinforced.

1924. An office storehouse, concrete pump house and six concrete operating houses at the Black Rock Lock were completed.

1925. The Black Rock Canal and Lock: Repairs were made to the towpath wall and maintenance dredging was done; 12 butterfly valves were installed in the lock gate.

In 1925-26, the Peace Bridge was constructed at the head of the Niagara River.

1926. The Black Rock Channel was widened with the removal of mud and clay. The Ferry Street Bridge was painted.

All permits for dredging sand and gravel from the United States portion of the river were canceled in May 1926.

In the calendar year 1926, the Canadian Queenston Plant (renamed the Sir Adam Beck No. 1) was completed.

1927. The east wing wall at the Black Rock Lock was extended 100 ft. Minor repairs were made to the towpath wall and the Bird Island Pier. The Black Rock Lock had underwater repairs and cleaning accomplished. Boulders were removed from the Cayuga Island Cut Channel.

1928. The Black Rock Canal was widened south of the International Bridge. Removed 200 ft. of the westerly end of the Rattlesnake Island Shoal. More repairs were made to the Bird Island Pier.

1929. The Black Rock Lock received underwater cleaning and repairs. Breaks in the Bird Island Pier were repaired. Repairs were also made to the towpath wall.

In the calendar year 1929, a Special International Niagara Board recommended construction of a submerged weir at the lower end of the Chippawa-Grass Island Pool.

1930. The Ferry Street storage warehouse was completed. Black Rock Lock cleaning and repairs were accomplished. Repairs were also made to the towpath wall. Repairs were made to breaks in the Bird Island Pier. Widening was carried out on the channel opposite the foot of Maryland Street, Buffalo.

1931. The Ferry Street oil storehouse was built. Repairs were made to the towpath wall and to the Bird Island Pier. The Black Rock Lock was cleaned and repaired. The Tonawanda Harbor was dredged.

1932. Repairs were made to the towpath wall, and the Black Rock Lock was cleaned and repaired. A new floor was placed on the Ferry Street Bridge and dredging was carried out under it.

1933. Black Rock Canal: A shoal was removed near the foot of Bird Island. Minor repairs were made to the Bird Island Pier. The lock received underwater cleaning and repairs. The Ferry Street Bridge was painted. The Black Rock Canal was dredged.

1934. The lock received underwater cleaning and repairs. The maintenance of a signal station, at the foot of Genessee street, was completed.

1935. Dredging in the used channels of the Little River was completed. Repairs were made to the towpath wall. Silt was removed from the lock. A new floor was constructed for the Ferry Street Bridge. Repairs were made to the lock and signal section.

1936. Repairs were made to the towpath wall. The Black Rock Channel was dredged, shoals and boulders were removed and the channel swept. The lock received underwater cleaning and repairs. The signal station was maintained. Shoals were removed from the Niagara River.

1937. Material was removed from the Black Rock Channel and Tonawanda Harbor. The lock received underwater cleaning and repairs. The Niagara River channels were swept and obstruction removed.

1938. Rock shoals were removed from the Black Rock and Ferry Street canals. The Tonawanda Basin was enlarged. The Bird Island Pier was extended. The towpath wall was repaired. Material was removed from the Black Rock Channel and Tonawanda Harbor. The lock received underwater cleaning and repairs. Repairs were made to the Ferry Street Bridge.

1939. Repairs were made to the towpath and 792 lin. ft. of bulkhead. The Black Rock Channel and Tonawanda Harbor had 93,943 cu. yds. of material removed. The Niagara River had obstructions removed.

1940. Black Rock Channel and Tonawanda Harbor: 104,390 cu. yds. of material removed. Repairs to the towpath and the bulkhead were made. The lock was closed for underwater cleaning and repairs. Repairs were made to the Ferry Street Bridge. The Niagara River was cleared of obstructions.

1941. Black Rock Channel and Tonawanda Harbor: 21,557 cu. yds. of material removed. Repairs to the towpath wall were made. The lock received underwater cleaning and repairs. The Niagara river was swept.

1942. The lock was cleaned and repaired. The Niagara river channel was swept and obstructions removed.

In the years between 1942 and 1947, a submerged weir in the Chippawa-Grass Island Pool was constructed.

1943. Materials were removed from the Black Rock Channel and Tonawanda Harbor. The lock was cleaned, repairs were made and the installation of intake valves in the upper guard gate were made. Repairs were made to the towpath wall and to the Squaw Island Dike. The Niagara River Channel was swept and obstructions removed.

1944. The lock was cleaned and repaired. The Niagara Channel was swept. Rock shoals were removed from the Lake Erie entrance to the canal and from the canal itself.

1945. The Bird Island Pier was repaired. Materials were removed from the Black Rock Harbor and Tonawanda Island. The lock was cleaned and repairs were made. The Channel was swept.

1946. Black Rock and Niagara Channels: Rocks and shoals were removed. Repairs to the Bird Island Pier were made. The lock was cleaned and repaired. The Niagara channel was swept.

1947. Rock Shoals were removed from the Black Rock and Niagara canals. Material was removed from the Black Rock Channel and Tonawanda Harbor. Repairs were made to the towpath wall and Bird Island Pier. The lock was cleaned and repaired. The Niagara Channel was swept.

1948. Removal of rock shoals from canals was 79% completed. The Bird Island Pier was repaired. Material was removed from the Black Rock Channel and Tonawanda Harbor. Channels were swept and obstructions removed. The lock was cleaned and repaired.

1949. The removal of rock shoals was completed. Material was removed from the Black Rock Channel and Tonawanda Harbor. Channels were swept and obstructions removed. Repairs were made to the towpath and Bird Island Pier. The lock was cleaned and repaired.

1950. Material and obstructions were removed from the Black Rock Channel and Tonawanda Harbor. Channels were swept and obstructions removed. Repairs were made to the Bird Island Pier and towpath wall. The lock was cleaned and repaired.

1951. The Niagara river was dredged below the lock. Repairs were made to the lower west guide pier, the towpath wall and Bird Island Pier. Channels were swept and obstructions removed. Material and obstructions were removed from the Black Rock Channel and Tonawanda Harbor.

1952. The Bird Island Pier was repaired. Channels were swept and obstructions removed. Material and obstructions were removed from the Black Rock Channel and Tonawanda Harbor. Repairs were made to the guide pier. The lock was cleaned and repaired.

1953. Channels were swept and obstructions removed. Material and obstructions were removed from the Black Rock Channel and Tonawanda Harbor. Repairs were made to the towpath bridge. The lock was cleaned and repaired; the east wall of the lock chamber was resurfaced.

In the calendar year 1953, work began on remedial works (Chippawa-Grass Island Pool Control Structure) to replace the Chippawa-Grass Island Pool submerged weir.

1954. Channels were swept and obstructions removed. Material and obstructions were removed from the Black Rock Channel and Tonawanda Harbor. Repairs were made to the towpath wall. The west wall of the lock chamber was resurfaced.

In the calendar year 1954, units of the Sir Adam Beck No. 2 Plant came into service.

1955. Repairs were made to the towpath wall. The Black Rock Canal and Niagara River were dredged and obstructions removed. Work was carried out on the lock walls. Minor obstructions were removed from the Niagara River channels.

1956. Repairs were made to the towpath wall. The Black Rock Canal and Niagara River were dredged and obstructions were removed. Snagging and clearing of the project channels were performed.

1957. Repairs were made to the Bird Island Pier. The Black Rock Canal and Niagara River were dredged and obstructions were removed. Snagging and clearing of the project channels were performed.

In the calendar year 1957, the Chippawa-Grass Island Pool Control Structure was completed.

1958. The Black Rock Canal and Niagara River were dredged and obstructions removed. Snagging and clearing of the project channels were performed. Repairs were made to a section of the upper west guide pier. Stream gaging and recalibration of gages were accomplished by Canada and the United States. The Lake Erie entrance to the Black Rock Canal was widened.

1959. Repairs were made to the lower guide pier. The Black Rock Canal and Niagara River were dredged. Snagging and clearing of the project channels were performed.

1960. Repairs were made to the lower guide pier. The Black Rock Canal and Niagara River were dredged. Snagging and clearing of the project channels were performed.

1961. Repairs were made to the lower guide pier. The Black Rock Canal and Niagara River were dredged. Snagging and clearing of the project channels were performed.

In the years 1961-1963, additions were made to the Chippawa-Grass Island Pool Control Structure.

1962. Black Rock Canal, Niagara River Channel and Tonawanda Harbor: Removed 80,328 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

1963. Black Rock Canal, Niagara River Channel and Tonawanda Harbor: Removed 72,638 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

1964. Black Rock Canal, Niagara River Channel and Tonawanda Harbor: Removed 95,013 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

1965. Black Rock Canal, Niagara River Channel and Tonawanda Harbor: Removed 99,769 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

Tonawanda Channel: removed 8,400 cu. yds., scow measure, of compacted material over an area of approximately 115,000 sq. yds., restoring approximately 50% of a mile-long channel to a project depth of 21 ft.

1966. Black Rock Canal, Niagara River Channel and Tonawanda Harbor: Removed 100,598 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

Tonawanda Channel: Removed 47,800 cu. yds., scow measure, of compacted material over an area of approximately 125,000 sq. yds., completing the restoration of a mile-long channel to a project depth of 21 ft.

1967. Black Rock Canal, Niagara River Channel and Tonawanda Harbor: Removed 166,026 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

Bird Island Pier: Repairs to 100 lin. ft. were made.

1968. Shoaled material was removed from the Black Rock Canal, Niagara River Channel and Tonawanda Harbor. Repairs were made to the Bird Island Pier. The Black Rock Lock was cleaned and repaired.

1969. Black Rock Canal and Niagara River Channel: Removed 121,948 cu. yds., bin measure, of shoaled material for the restoration of a project depth of 21 ft.

Bird Island Pier: Repairs to 100 lin. ft. were made.

1970. Repairs were made to the Bird Island Pier. Shoaled material (94,725 cu. yds.) removed from the Black Rock Canal and Niagara River Channel. The lock was cleaned and repairs were made. Snagging and clearing of the Niagara channels were performed.

1971. Black Rock Canal: Removed 24,835 cubic yards of shoaled material. The lock was cleaned and repairs were made. Snagging and clearing in the project channels were performed. Repairs were made to the Bird Island Pier.

1972. Black Rock Channel: Removed 13,430 cu. yds. of shoaled material. The Black Rock lock was cleaned and repairs were made. Repairs were made to the Bird Island Pier. Snagging and clearing in the project channels were performed. Shoals were removed from the project channels.

1973. Black Rock Channel: Removed 23,842 cu. yds. of shoaled material. The Black Rock Lock was cleaned and repairs were made. Repairs were made to the Bird Island Pier. Snagging and clearing in the project channels were performed.

1974. Black Rock Channel: Shoaled material was removed. The lock received underwater cleaning and repairs were made. Repairs were made to the Bird Island Pier. General maintenance on the lock was performed.

1975. The lock received cleaning and repairs were made. Repairs were made to the Bird Island Pier. Clearing and snagging in the project channels were performed.

1976. The lock received cleaning and repairs were made. The Bird Island Pier was repaired. Clearing and snagging in the project channels were performed. Shoal material (1,432 cu. yds.) removed from the Black Rock Channel.

1977. The lock received underwater cleaning and repairs were made. About 5,000 lin. ft. of hand rail was installed on the Bird Island Pier. Clearing and snagging in the project channels were performed.

1978. The lock received cleaning and repairs were made. Repairs were made to the Bird Island Pier. Shoal material (6,633 cu. yds.) removed from the Black Rock Channel. Clearing and snagging in the project channels were performed.

1979. The lock received cleaning and repairs were made. Clearing and snagging in the project channels were performed. Shoal material (49,305 cu. yds.) removed from the Black Rock Channel.

1980. The lock received cleaning and repairs were made. Clearing and snagging in the project channels were made. Engineering of the in-house effort for the installation of sanitary facilities at the lock, rehabilitation of the lock control houses and pump house was performed.

1981. The lock received underwater cleaning and repairs were made. Clearing and snagging in the project channels were made. Sanitary facilities were installed on the lock wall. Remodeling of the lock control houses was conducted and repairs to the concrete cap of the lock walls were made. Engineering of the in-house effort for the installation of sanitary facilities at the lock, rehabilitation of the lock control houses, repairs to the concrete on the east wall and repairs to the fenders on the lock walls were performed.

1982. The lock was cleaned and repairs were made. Clearing and snagging in the project channels were made. Structural repairs were made to the Bird Island Pier, fendering and lock gates. The lock building windows and doors were replaced. The east wall

concrete walkway was widened. Fenders on the lock wall and the lock watering pump were repaired.

1983. The lock was cleaned and repairs were made. Cleaning and snagging in the project channels were made. Structural repairs were made to the Bird Island Pier, fendering and lock gates. The lock building windows and doors were replaced. The east wall concrete walkway was widened. Fenders on the lock wall and the lock watering pump were repaired.

1984. The lock was cleaned and repaired. Structural repairs were made to the Bird Island Pier, fendering and lock gates. Rehabilitation of miter gates and the lower guard gate were conducted. Clearing and snagging in the project channels were performed.

1985. The lock was closed for underwater repairs. An elevated concrete walkway with railing and three refuge platforms on the Bird Island Pier were under construction. Rehabilitation of the upper and lower guard gates was conducted. Rehabilitation of the gates' butterfly valves was conducted. Clearing and snagging of the project channels were performed.

1986. An elevated concrete walkway with railing and three refuge platforms on the Bird Island Pier were under construction. The lock received underwater cleaning and repairs were made. Snagging and clearing in the project channels were performed. Rehabilitation of the gates' butterfly valves was conducted. The Black Rock Channel was dredged; an estimated 20,000 cu. yds. of material removed.

1987. An elevated concrete walkway with railing and three refuge platforms on the Bird Island Pier were under construction. The lock received underwater cleaning and repairs were made. Snagging and clearing of the project channels were performed.

1988. The Black Rock Lock received cleaning and repairs were made. Snagging and clearing in the project channels were made. A light standard was installed at the knee of the guide pier. Fenders within the channel immediately preceding the lock were repaired. The west lockwall was rehabilitated/widened. Various channels and Tonawanda Creek were dredged.

1989. The lock was closed for underwater cleaning and repairs were made. A sunken vessel was removed from the Peace Bridge. Snagging and clearing was performed in the Black Rock Channel. The Bird Island Pier was repaired. Various channels and Tonawanda Creek were dredged. The Lake Erie entrance to the canal was widened.

1990. Snagging and clearing was performed at the Black Rock Lock. Various channels were dredged and widened.

1991. Snagging and clearing was performed at the Black Rock Lock. Repairs were made to the Bird Island Pier. Lockwall foundation voids were filled (pressure grouted). Various channels were dredged and widened. Rock shoals were removed from the Lake Erie entrance to the Black Rock Canal, in the canal south of the Ferry Street Bridge and various other places.

1992. Repairs were made to the Bird Island Pier. Snagging and clearing was carried out for the Black Rock Lock. Lockwall maintenance was performed. Lockwall foundation voids were filled (pressure grouted). Various canals were dredged and widened. Tonawanda Creek was being deepened to 16 feet. Rock shoals were removed from various locations.

1993. Repairs were made to underwater operating equipment and the Black Rock Lock was dewatered. Snagging and clearing was carried out for the lock. Various channels were dredged and widened. Tonawanda Creek was deepened to 16 ft.. Rock shoals were removed from various locations.

FIRST WELLAND CANAL

1824. Construction of first canal commenced by a private company. Original idea was to supply the upper reach from the Welland River. The canal was to be carried through the ridge between Port Robinson and Allanburgh in a tunnel and to descend the slope by means of a railway and thence by canal to Lake Ontario. Canal was to be 4 ft. deep and 7 ft. wide at the bottom.

1825. New plan adopted. Entrance from Lake Ontario to be at Port Dalhousie. The depth to be 8 ft. with summit level 9 ft. below Lake Erie, supplied by the Welland River.

1828. Decided to abandon the Welland River as feeder, and to obtain supply from the Grant River, at Dunneville by means of a feeder canal 27 miles long with summit level 15-1/2 ft. above the Welland River and 8 ft. above Lake Erie.

1829. Canal completed. The route as existing at this time was up the Welland River for 9-1/2 miles, where ascent to the canal level was made by 2 locks. The depth of the feeder from the Grand River was 5 ft. There were 40 locks 110 ft. long, 22 ft. wide with 8 ft. depth on sills.

1831. Work started to carry the Canal from Port Robinson to Port Colborne.

1833. Canal to Port Colborne completed. At this time there were 40 locks providing 7-1/2 ft. depth.

1841. Full ownership and control of the canal was assumed by the Government. Decided that the locks were to be rebuilt with a 9 ft. depth. The feeder was to be converted into a navigable canal and a branch from the feeder to be built to Port Maitland with an entrance lock at that point.

SECOND WELLAND CANAL

1842. Work started on project for deepening canal to 9 ft. depth. Locks to be rebuilt and feeder to be converted into a navigable canal and a branch from the feeder to be built to Port Mailand with an entrance lock at that point. There were to be 27 locks 150 ft. long, 26 ft. wide with 9 ft. on sills.

1845. Canal and locks from Port Dalhousie to the feeder and from the feeder to Dunneville as well as the Port Maitland Branch completed; 27 locks with 9 ft. depth.

1846. Work commenced on lowering of summit level to that of Lake Erie. This was not fully completed until 1881.

1850. Although uncompleted, the section from the feeder to Port Colborne was put into commission.

1853 to 1855. Depth increased to 10 ft. by raising banks and walls as well as by dredging.

THIRD WELLAND CANAL

1871. Report of Canal Commission recommended increase in size of locks to 270 ft. by 45 ft. with 12 ft. of water on sills.

1873. Work started on enlargement to 12 ft. depth.

1875. Decided to increase depth to 14 ft.

1881. Summit level lowered to Lake Erie level.

1883. 12 ft. depth available.

1887. 14 ft. depth available.

1887. The condition of the canal in 1887 was as follows: two distinct canals from Port Dalhousie to Allanburgh, a distance of 11-3/4 miles, with one canal from Allanburgh to Port Colborne, 15 miles. There were 25 lift locks, and one guard lock on the main canal to overcome an average rise of lockage of 325.50 ft. The depth available by the main route was 14 ft.

Welland River Route from the canal at Port Robinson to the Niagara River, with one lock at Pt. Robinson to descend the Welland River and one at the Aqueduct to ascend the Welland River. The depth available was 9 ft. 10 in.

Grand River Feeder form Dunneville to the canal, 21 miles long, with 2 locks to overcome a total difference in level of 8 ft. Depth available was 9 ft.

Port Maitland Branch from the Feeder to Port Maitland, 1.75 miles in length. One lock of 7-1/2 ft. rise and 11 ft. depth.

WELLAND SHIP CANAL

1913. Construction started.

1931. Vessels of St. Lawrence Canal size with draft of 18 ft. allowed through canal on opening of navigation.

1932. August 6th. All restrictions as to size of vessels removed but draft restricted to 22 ft.

1933. May 5th. Vessels up to 700 ft. length by 75 ft. width with draft up to 23-1/2 ft. permitted to canal.

1940. July 1st. Draft restricted to 23 ft.

The present Welland Canal is a modified version of the Welland Ship Canal. Improvements have been made at various locations along the canal to enhance its efficiency. Since 1959, the canal has been operated as an integral part of the St. Lawrence Seaway system by the St. Lawrence Seaway Authority, a Canadian Crown Corporation.